

1872NRASt.33...71W
I send herewith the result of some recent observations on the small coloured cluster about α *Crucis*. Many of the stars have drifted considerably since the Cape drawing was made, and of the stars included in that drawing, there are five small ones that I could not see; but the most remarkable fact is, that using a 7 $\frac{1}{4}$ in. refractor I have detected twenty-five stars not recorded, and therefore, I think there can be no doubt, *not seen* by Sir John Herschel with his large reflector; and if in a small space like this twenty-five new stars may appear in so short a time, it is evident that more attention should be bestowed on clusters. The colours in this cluster are very beautiful, and fully justify Herschel's remark that it looks like a "superb piece of fancy jewellery."

I do not know whether the results sent are suitable for publication by the R. A. Society, but I have sent them for that purpose.

I also send my Annual Report for 1871.

*The Observatory,
Sydney, New South Wales.*

*Note to accompany the Chart showing the relative position
of the two stars in Castor. By J. M. Wilson, Esq.*

The chart embraces a period of 160 years, from A.D. 1720 to A.D. 1880. The right hand curve has reference to the dates on the right side of the chart, and the left hand curve to the dates on the left of the chart. A change of angle is shown from 355° to 235° , the degrees marked at the top having reference to the upper or right-hand curve, and those at the bottom to the lower or left-hand curve. Part of the curve is repeated to show the continuity of curvature. The dots enclosed in small circles belong to the right-hand curve, the others to the left. Every observation made use of is included in the annexed list, which was furnished me by Mr. Gledhill, of Halifax.

Table I.

Date.	θ	Observer.	Date.	θ	Observer.
1719.84	355.88	B and P	1825.24	263.30	S
1759.80	323.78	B and M	1826.22	262.54	α
1779.85	302.78	H	1827.28	262.52	Σ
1783.64	293.05	..	1828.67	261.87	H
1791.15	292.95	..	1829.88	260.97	H
1792.16	297.27	..	1830.52	259.02	H
1795.95	283.88	..	1830.95	258.80	Sm
1800.27	284.32	..	1831.22	258.32	Da
1802.08	282.77	..	1832.12	258.42	Da
1803.19	280.55	..	1833.15	258.10	Da
1814.83	272.87	Σ	1834.08	257.23	Da
1816.97	270.00	H	1835.33	255.48	Σ
1820.34	268.99	Σ	1836.31	255.20	Sm
1821.21	267.12	H and S	1838.21	254.90	Da
1822.01	266.81	Σ	1840.20	254.13	Da
1823.11	264.98	H and S	1841.11	252.82	M

Date.	θ	Observer.	Date.	θ	Observer.
1842.08	253.38	Da	1859.98	243.6	Mo
1843.13	252.30	Sm	1860.22	242.7	Da
1845.95	249.80	H	1863.00	243.0	R
1846.73	249.46	H	1863.02	242.7	R
1847.25	249.85	Da	1863.03	241.6	De
1848.28	249.54	W C B	1863.12	242.3	R
1849.32	248.97	Da	1863.51	242.	Da
1851.04	248.67	F	1864.30	242.1	Da
1852.66	246.39	M	1865.04	239.71	K
1853.34	246.26	M	1865.30	241.4	Da
1854.38	244.72	M	1865.31	241.4	Da
1855.31	243.60	M	1866.09	243.2	T
1855.82	245.1	Se	1866.13	237.36	T
1856.20	245.4	De	1866.17	240.6	T
1856.35	243.7	M	1867.09	242.9	T
1856.73	245.5	J	1867.27	242.9	T
1857.34	244.2	De	1871.99	237.06	K
1857.36	242.9	M	1870.02	236.58	K
1857.77	245.1	J	1872.20	237.2	S and W
1858.26	244.4	Mo	1872.26	238.26	S
1858.37	244.1	M	1872.27	238.9	S
1859.26	243.8	Mo	1872.28	237.7	W
1859.36	242.7	M			

The interpolating curve gives a series of readings of dates corresponding to every 5° . These are corrected, to eliminate errors of drawing and of measurement, by taking differences as far as the third order (what Herschel calls "smoothing" the curve), with the following results, taken at intervals of 10° .

Table II.

θ	t	θ	t
340	1740.46	280	1804.89
330	1752.44	270	1816.89
320	1763.14	260	1830.39
310	1773.34	250	1846.45
300	1783.49	240	1866.49
290	1793.89		

From these $\frac{dt}{d\theta}$ is computed at each epoch, and thence r , since $r^2 \propto \frac{dt}{d\theta}$ and then r and θ converted into rectangular co-ordinates.

The equation

$$0 = 1 + \alpha x + \beta y + \gamma x^2 + \delta xy + \epsilon y^2$$

is assumed, and the co-efficients, $\alpha, \beta, \gamma, \delta, \epsilon$, determined by the method of least squares. This solution of the equations, which is very laborious, has been again repeated by Mr. Henry Stevenson,

of Bedford, to a higher degree of accuracy than previously, and the co-efficients obtained differ slightly, and in two instances, rather seriously, from those given in the Supplementary Number of the *Monthly Notices* for 1872. His latest result is

$$\begin{aligned}\alpha &= .0088906 \\ \beta &= .0050951 \\ \gamma &= .0000054 \\ \delta &= .000032 \\ \varepsilon &= -.0000331\end{aligned}$$

The results of substituting these values in the ten equations derived from Table II. are, according to Mr. Stevenson,

$$\begin{array}{lll} \text{In} & (1) & = -.2120478 \\ & (2) & = -.0412761 \\ & (3) & = .0334101 \\ & (4) & = .0676907 \\ & (5) & = .0799079 \end{array} \quad \begin{array}{lll} \text{In} & (6) & = .0762893 \\ & (7) & = .0617704 \\ & (8) & = .0381189 \\ & (9) & = .0053100 \\ & (10) & = -.0423452 \end{array}$$

This shows that the early observations are incompatible with the rest, as the result of substitution is so large; and they have, therefore, prejudicially affected the conclusion to some extent. The orbit so determined has an eccentricity

$$e = 1.339863.$$

As the interest in *Castor*'s orbit lies principally in the fact of its being or not being hyperbolic, we have not attempted to work it out beyond this point. I have furnished the elements given above as they may, perhaps, assist some one in repeating the calculation, and, at any rate, show exactly on what data the conclusion rests.

Temple Observatory,
Rugby, Nov. 1872.

Meteor Shower of November 27th, 1872, observed at Newcastle-upon-Tyne. By Prof. A. S. Herschel, F.R.A.S.

The meteors were first noticed a few minutes before six o'clock, and I commenced recording their apparent paths, with a perfectly clear sky at six o'clock. Two students of the Physical Science College, Mr. E. Haigh and Mr. F. Hurman, began to count their numbers at 6^h 10^m, their backs being against a high wall facing nearly due west, and about four-fifths of the western sky being well within their view. They counted aloud to prevent reduplication, and at 6^h 45^m, when clouds drawing over from the north-east began to encroach upon the western half of the sky they had reckoned 453 meteors in thirty-five minutes. The shower occurring unexpectedly our party was found to be without a watch, but the time was occasionally given by bystanders and being rectified at each quarter of an hour by the neighbouring